~~APPARATUS AND METHOD FOR PRODUCING ICE CONTAINER~~ USING ICE POWDERS

Technical Field

The present invention relates to an ice container, and more particularly, to an apparatus and method for producing an ice container using ice powders, capable of easily producing the ice container of various shapes and allowing mass production thereof.

Background Art

Generally, ice containers are used to carry foods when eating the cold foods in summer season.

Containers or cups carrying cold foods such as sliced raw fish or iced vermicelli, cold beverages, or juices mixed with fruits as a punch are maintained in a cold state for a long time, thereby maintaining the degree of freshness thereof until men eat the foods or drink the beverages or juices.

At that time, in order to maintain the containers or cups in the cold state, the containers or cups are kept in a refrigerator within a certain period of time so that they are frozen. The foods or beverages are carried into the cold containers or cups.

Since the containers or cups are made of glass, porcelain or stainless steel, heat transfer to the atmosphere from the containers or cups easily happens. Therefore, they cannot maintain the cold state for a long time. In other words, the cold property thereof is disappeared after a given period of time.

In addition, in order to freeze the containers or cups, they must be disposed in the refrigerator for a long time, thereby requiring much time to freeze them and increasing the capacity of the refrigerator. Therefore, a wide space has to be provided to install the refrigerator of large capacity. Also, power consumption of the refrigerator is increased.

In recent, ice containers are generally used to carry the food, beverage, or

juice mixed with fruits. An apparatus for producing the ice container includes, as shown in Figs. 1 and 2, a mold 1 having a cavity for forming an exterior surface of the ice container 4, and a forming member 2 disposed within the mold 1 for forming an interior surface of the ice container 4. An interior surface of the mold is provided with a pattern of various shapes. The shaping member 2 has a plurality of latching portions 3 latched on an upper edge of the mold 1.

When the forming member 2 is put in the cavity of the mold 1, each latching portion 1 of the forming member 2 is latched on the upper edge of the mold 1, thereby forming a desired space between the interior surface of the mold 1 and the exterior surface of the forming member 2.

The mold 1 with the space filled with water is carried and put into a freezer, so that the water is frozen within the freezer.

If the water is completely frozen to form the ice container, the forming member 2 is detached from the ice container 4, and then the ice container is detached from the mold 1. The ice container 4 has an interior surface corresponding to the interior surface of the mold 1 and an exterior surface corresponding to the exterior surface of the forming member 2.

If a food, a beverage, a fruit or a juice mixed with fruits as a punch is put into the ice container 4 formed as described above, the contents may be maintained in a cold state for a long time.

According to the process of producing the ice container, the ice container is formed by filling the cavity of the mold with the water and then freezing the water in the freezer. However, when the water filling the cavity of the mold is frozen in the freezer, since the water is unevenly contracted, there is a problem in that the shape of the ice container is not properly formed.

In addition, the molds and forming members of various shapes must be provided to form the ice container in various sizes and shapes. Accordingly, the expense is very heavy to provide the molds and forming members.

Also, the process of filling and freezing the water in the mold is complicated,

and much time is required to freeze the water, so that mass production is difficult. Therefore, since the cost of the ice container is increased, there is another problem of lowering credibility and buying desire of consumers to the ice container.

Even though the ice container is produced by using an apparatus for producing ice container through the above process, a size and capacity of the apparatus must be increased. Therefore, the manufacturing cost of the ice container may be also increased. Of course, it cannot still solve the above problems of mass production of the ice container and uneven contraction of the water.

Disclosure of the Invention

Therefore, an object of the present invention is to solve the problems involved in the prior art, and to provide an apparatus and method for producing an ice container, in which a freezer is provided with an ice grinding unit and an ice container forming unit for compressing ice powders to form the ice container, so that deformation of the ice container may be minimized when forming the ice container by compressing the ice powders, thereby allowing mass production of the ice container and reducing a manufacturing cost of the ice container.

In order to accomplished the above-mentioned object, according to one aspect of the present invention, there is provided an apparatus for producing an ice container using ice powders, comprising: an ice grinding unit for grinding an ice mass into ice powders; a freezer positioned at one side of the ice grinding unit for maintaining the ice grinding unit in a proper temperature to prevent the ice powders from being molten; an ice container forming unit installed in the freezer for receiving and compressing the ice powders to form the ice container; a guide coupled to the ice container forming unit for guiding movement of the ice container forming unit by a given distance; a turntable rotatably installed in the freezer, the ice container compressed by the ice container forming unit moved by the guide being laid thereon; and a plurality of cold air distributors installed at an outside of the turntable for blasting cold air onto a surface of the ice container to freeze the surface of the ice

container.

According to another aspect of the present invention, there is provided a method for producing an ice container using ice powders, comprising the steps of: grinding an ice mass into the ice powders; reciprocately moving exterior forming molds having a groove for accommodating the ice powders introduced from an ice grinding unit; reciprocately blocking a bottom of an opening formed by the grooves of the contacted exterior forming molds; introducing the ice powders ground by the ice grinding unit into the opening formed by the ice grinding unit; reciprocately moving the upper mold to compress the ice powders, thereby forming the ice container; if the ice container is formed, detaching the upper and lower molds from the ice container; guiding the exterior forming molds, in which the ice container is disposed, along a guide, laying the molds on an upper surface of the turntable, and detaching the ice container from the exterior forming molds; and supplying a cold blast generated from a cold air distributor onto a surface of the ice container rotated on the turntable.

Brief Description of the Drawings

The above objects, other features and advantages of the present invention will become more apparent by describing the preferred embodiment thereof with reference to the accompanying drawings, in which:

Fig. 1 is a perspective view showing a conventional apparatus for producing an ice container.

Fig. 2 is a cross-sectional view of a manufacturing state of a conventional ice container.

Fig. 3 is a schematic view of an apparatus for producing an ice container using ice powders according to one preferred embodiment of the present invention.

Fig. 4 is a perspective view showing an ice container forming unit according to the present invention.

Figs 5a to 5i show a process of producing an ice container using ice powders according to one preferred embodiment of the present invention.

Fig. 6 is a perspective view showing left and right molds of an ice container forming unit according to another embodiment of the present invention.

Best Mode for Carrying Out the Invention

Reference will now be made in detail to preferred embodiments of the present invention, examples of which are illustrated in the accompanying drawings.

Fig. 3 is a schematic view of an apparatus for producing an ice container using ice powders according to one preferred embodiment of the present invention, Fig. 4 is a perspective view showing an ice container forming unit according to the present invention, and Figs 5a to 5i show a process of producing an ice container using ice powders according to one preferred embodiment of the present invention.

The apparatus of the present invention includes an ice grinding unit 10 for grinding an ice mass into ice powders, a freezer 20 positioned at one side of the ice grinding unit for maintaining the interior of the ice grinding unit 10 in a proper temperature to prevent the ice powders from being molten, and an ice container forming unit installed in the freezer 20 for forming an ice container 4 by compressing the ice powders ground within the ice grinding unit.

The ice grinding unit 10 is provided with an ice powder input port 11 connected to the freezer 20 for inputting the ground ice powders into the freezer 20.

The ice container forming unit includes, as shown in Fig. 4, a plurality of molds for forming an exterior surface of the ice container, i.e., left and right molds 30 and 31. The left and right molds can be reciprocately moved in such a manner that one side is contacted and detached from the other side, and have a groove 36 of a shape corresponding to the exterior surface of the ice container, respectively. The ice container forming unit also includes an upper mold 32 disposed over the left and right molds 30 and 31 for compressing the ice powders introduced into an opening 80 formed by the left and right molds 30 and 31, the upper mold 32 be reciprocately

moved into the opening 80. In addition, the ice container forming unit includes a lower mold 33 for blocking a bottom of the opening 80 formed by each groove 36 when the left and right molds 30 and 31 are contacted to each other, the lower mold 33 be reciprocately moved toward the bottom of the opening 80.

The lower mold 33 has a protrusion 37 for forming an interior surface of the ice container 4.

The opening 80 may have various shapes corresponding to the shape of the groove 36. Specifically, the opening 80 may be formed in a circular, polygonal or irregular shape, and the interior and exterior surfaces of the ice container 4 may be varied depending upon the shape of the groove 36 and the protrusion 37.

In order to easily detach the left and right molds 30 and 31 and the upper and lower molds 32 and 33 from the ice container 4 formed by compressing the ice powders within the molds 30, 31, 32 and 33, each of the molds 30, 31, 32 and 33 has a steam line connected to each inside of the molds for supplying and discharging steam heated by a desired temperature.

Each of the molds may be provided with a heat coil heated by a desired temperature, as well as installing the steam line 35 for supplying and discharging the steam to easily detach the left and right molds 30 and 31 and the upper and lower molds 32 and 33 from the ice container 4. Any means for applying the heat to the molds to easily detach the molds 30, 31, 32 and 33 from the ice container 4 may be employed.

The left and right molds 30 and 31 may be provided in each of interiors thereof with a cavity for accommodating the steam line 35 or heat coil.

The reciprocating motions of the left and right molds 30 and 31 and the upper and lower molds 32 and 33 are achieved by a hydraulic unit 34 coupled to the molds.

The ice container is formed by the molds 30, 31, 32 and 33 within the freezer 20, and the freezer 20 includes a guide 50 for guiding the movement of the left and right molds 30 and 31 to reciprocately move the molds 30 and 31 by a constant distance, in the state that the upper and lower molds 32 and 33 are detached from the

ice container.

Also, the freezer 20 includes a turntable 40 on which the ice powders (i.e., ice container 4) compressed by the left and right molds 30 and 31 moved by the guide 50 within the ice container forming unit is laid. The turntable 40 has a steam line 35 for supplying or discharging the steam heated by a desired temperature or a heat coil for generating a heat so as to detach the ice container 4 from an upper surface of the turntable 40.

In addition, the freezer 20 includes a plurality of solution injectors 70 for injecting a cold solution onto the surface of the compressed ice powders (ice container 4) rotated by the turntable 40 so as to fill gaps formed on the surface of the ice container for smoothing the surface or apply a pattern or color onto the surface.

Cold water or solution containing a harmless color may be used as the above solution.

Each of solution injectors 70 for injecting the solution is provided at an inlet thereof with a heat wire for generating the heat so as to prevent the injected solution from being frozen.

Also, the freezer 20 includes a plurality of cold air distributors 60 installed at the outside of the turntable 40 for blasting the cold air onto the surface to increase strength of the ice container 4 by freezing the surface of the compressed ice container laid on the upper portion of the turntable 40 and to adhere the solution injected from the injector 70 to the surface of the ice container.

The left and right molds 30 and 31 are provided at each one side thereof with a plurality of small holes 38 for outwardly discharging the water resulted from the ice container 4 when the upper and lower molds 32 and 33 are separated.

The left mold 30 has a plurality of guide holes 82 at an abutting surface of the left mold opposed to the right mold, and the right mold 31 has a plurality of guide rods 81 at an abutting surface of the right mold opposed to the left mold, as shown in Fig. 6, so that the guide rods and guide holes guide the correct abutment of the left and right molds 30 and 31.

The molds 30, 31, 32 and 33 and the hydraulic unit 34 are detachably coupled such a manner that the molds may be replaced by other molds of various sizes and shapes.

The operation of the apparatus according to the present invention will now be described.

The ice masses are introduced into the ice grinding unit 10 and are ground into the ice powders. The ice powders are inputted into the freezer 20 disposed at one side of the ice grinding unit 10 through the ice powder input port 11. The ice powders inputted into the freezer 20 are compressed and formed in the ice container by the ice container forming unit.

Describing the operation of the ice container forming unit for forming the ice container, the molds for forming the exterior surface of the ice container 4, i.e., the left and right molds 30 and 31, are slidingly moved by the hydraulic unit. The left and right molds 30 and 31 are reciprocately moved in a left or right direction, such that the abutting surface of the left mold is contacted or detached from the abutting surface of the right mold.

If the abutting surface of the left mold is contacted to the abutting surface of the right mold, the opening 80 is formed by the grooves 36 each formed at one side of the left and right molds 30 and 31. The bottom of the opening 80 is blocked by the lower mold 33 having the protrusion 37 forming the interior surface of the ice container 4, the lower mold 33 disposed under the left and right molds 30 and 31 and moved upwardly by the hydraulic apparatus.

In this state, the ice powders passing through the ice powder input port 11 are introduced into the opening 80 formed by the left and right molds 30 and 31, as shown in Fig. 5a. If the input of the ice powders is completed, the upper mold 32 disposed over the left and right molds 30 and 31 is inserted into the opening 80 to compress the introduced ice powders, as shown in Fig. 5b.

Specifically, the ice powders is hardened or compressed by a constant pressure resulted from the reciprocately moving upper mold 32.

At that time, the ice powders may form the ice container by introducing them at once into the opening 80 of the ice container forming unit. If the ice container of a desired shape is not formed by introducing them at once, a sufficient amount of ice powders may be filled in the opening 80 by repeatedly introducing them, and then be compressed.

In other words, the ice powders are introduced into the opening 80, and are hardened by the reciprocately moved upper mold 32, thereby compressing the ice powders. At that time, the ice powders are again introduced into the opening 80, and are continuously hardened by the reciprocately moved upper mold 32.

This process can form the ice container of a desired shape by eliminating a space to be produced between the hardening ice powders, repeatedly introducing the ice powders until the ice container of a desired shape is obtained, and continuously hardening the introduced ice powders using the reciprocately moved upper mold 32.

According to the compression of the ice powders by the reciprocately moved upper mold 32, the ice powders are formed in the ice container by the left and right molds 30 and 31 and the upper and lower molds 32 and 33.

Upon forming the ice container 4, the steam heated by the desired temperature is supplied and discharged into the steam lines 35 each installed in the upper and lower molds 32 and 33. Specifically, if the steam is introduced into the upper and lower molds 32 and 33, the temperature of the upper and lower molds 32 and 33 is increased, so that the exterior surface of the ice container 4 adhered to the upper and lower molds 32 and 33 is molten.

The upper and lower molds 32 and 33 are detached from the exterior surface of the ice container 4, and are respectively moved in the upper or lower direction by the hydraulic unit 34, as shown in Fig. 5c.

And then, the left and right molds 30 and 31 forming the ice container 4 therein are moved onto the turntable 40 according to the guidance of the guide 50, and are laid on the upper surface of the turntable 40, as shown in Fig. 5d.

The left and right molds 30 and 31 laid on the upper surface of the turntable

40 are divided from each other. Specifically, the left and right molds 30 and 31 is heated by passing the steam through the steam lines 35 each installed in the respective molds 30 and 31, so that the exterior surface of the ice container 4 adhered to the left and right molds 30 and 31 is molten.

At that time, since a plurality of holes 38 are formed at one side of the respective left and right molds 30 and 31, the water resulted from the molting ice container 4 by the heated left and right molds 30 and 31 is outwardly discharged through the holes 38.

If the temperature of the left and right molds 30 and 31 is increased, the left and right molds 30 and 31 are detached from the exterior surface of the ice container 4, and are moved in the left and right directions by the hydraulic unit 34, as shown in Fig. 5e, thereby dividing the left and right molds 30 and 31

Simultaneously, the ice container 4 is laid on the upper surface of the turntable 40, and is rotated by the rotating turntable 40. At that time, the surface of the ice container is coated with the solution injected by the respective solution injectors 70 installed at the turntable 40, as shown in Fig. 5f.

Specifically, the solution injected by the solution injectors 70 contains cold water or a harmless color to men, and the gaps formed on the surface of the ice container are filled so as to smooth the surface or a pattern or color is applied onto the surface thereof, by injecting the solution onto the surface of the compressed ice container 4.

Upon completing the application of the solution, the cold air is supplied to the ice container 4 rotated on the turntable 40 by the cold air distributors 60 installed at the outside of the turntable 40, thereby increasing the strength of the ice container 4 by freezing the surface of the compressed ice container laid on the upper portion of the turntable 40 and fixedly adhering the solution injected from the injectors 70 to the surface of the ice container to allow the surface to be coated with the color contained in the solution.

If the surface of the ice container 4 is perfectly frozen by the supplied cold air,

the steam is supplied into the steam line 35 installed in the turntable 40, as shown in Fig. 5h, so that the surface of the ice container 4 adhered to the upper surface of the turntable is molten to detach the ice container 4 from the turntable. The detached ice container 4 is formed in the shape as shown in Fig. 5i.

If the ice container 4 formed as described above is carried out of the freezer 20, and a food, a beverage, a fruit or a juice mixed with fruits as a punch is put into the ice container, the contents may be maintained in a cold state for a long time.

While the present invention has been described and illustrated herein with reference to the preferred embodiments thereof, it will be apparent to those skilled in the art that various modifications and variations can be made therein without departing from the spirit and scope of the invention. Thus, it is intended that the present invention covers the modifications and variations of this invention that come within the scope of the appended claims and their equivalents.

Industrial Applicability

As apparent from the above description, the freezer is provided with the ice grinding unit and the ice container forming unit for compressing the ground ice powders to form the ice container, so that deformation of the ice container may be minimized when forming the ice container by compressing the ice powders. Therefore, the shape of the ice container may be properly formed at a short time, thereby allowing mass production of the ice container.

In addition, the manufacturing cost of the ice container may be reduced, and the apparatus for producing the ice container may be inexpensive. Also, power consumption of the apparatus may be significantly reduced.

Furthermore, it is possible to easily manufacture the ice container in various shapes, such as circular, polygonal or irregular shape, since the ice container forming unit is replaced by other unit. Of course, a wanted pattern may be engraved or embossed on the exterior and interior surfaces of the ice container.